Zoonotic Disease Newsletter

Washington State Department of Health's bulletin on zoonoses and vector-borne diseases

January 2007 **Volume 1, Issue 1**

In This Issue

Welcome to the first issue of DOH's *Zoonotic Disease Newsletter*, previously known as the DOH *West Nile Virus Newsletter*. The *Zoonotic Disease Newsletter* will encompass a broad range of zoonotic and vector-borne disease topics. West Nile virus will continue to be a significant part of the *Newsletter*, especially during the upcoming West Nile monitoring season. Enjoy! Dorothy Tibbetts, Manager, Zoonotic Disease Program

Climate change raises vector-borne disease concerns

By Liz Dykstra, Ph.D. Entomologist, WA DOH Zoonotic Disease Program

Retreating glaciers around the world, pack ice reduction in the Arctic, and the break-up of ice shelves in the Antarctic are some of the clearest indicators of global warming. As more evidence of climate change occurs, a critical concern is how such change will impact our daily lives.

The relative sensitivity of glaciers to climate change is illustrated by the dramatic recession of Grinnell Glacier in Glacier National Park, Montana. Upper Grinnell Lake continues to enlarge and fill with icebergs as the glacier recedes.

As temperatures change, we can also expect changes in relative humidity and precipitation levels. These alterations, in turn, will impact arthropod vectors of diseases. Insects and other arthropods (e.g. ticks and mites) are very sensitive to climate variations. Fossil records and ancient climate data demonstrate that geographic shifts of beetles have been closely associated with changes in climate.

Today, public health workers and researchers regularly report mosquito-borne diseases at higher elevations in Asia, Central Africa and Latin America where these diseases never used to occur. A steady rise in annual temperatures has been associated with expanding malaria transmission in East Africa. Dengue fever, once limited to an altitude of about 1,000 meters, has appeared at elevations of 1,700 meters in Mexico and the vector, *Aedes aegypti*, has been reported at 2,200 meters in Colombia.

In Washington, data show that during the last century, the Puget Sound region warmed up substantially more than the global warming trend of 1.1°F (0.6°C). The average annual temperature around the Puget Sound increased 2.3°F (1.3°C). Much of this warming took place in the second half of the 20th century, with rural climate stations warming just as much as urban stations.

These reports substantiate concerns that rising temperatures may increase the range of some mosquito species and, within certain parameters, increase their efficiency as vectors. For example, both *Ae. aegypti*, a vector of dengue and yellow fever, and *Ae. albopictus,* a vector of dengue and a competent laboratory vector of yellow fever and over 20 other arboviruses, are essentially warm weather species. A 2 or 3 °C increase in global temperatures could enable these species to extend their ranges.

Climate change continues on page 5

Washington State Department of Health
Zoonotic Disease Newsletter

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WSDA seeks volunteers for avian influenza surveillance testing of backyard flocks

Washington State Department of Agriculture, News Release, January 31, 2007

WSDA hopes their financial incentive will encourage farmers and backyard poultry owners to volunteer their birds for avian influenza testing. View WSDA's Avian Influenza Web site at agr.wa.gov/FoodAnimal/AnimalHealth/Diseases/AvianInfluenza/default.asp.

OLYMPIA – Officials of the Washington State Department of Agriculture (WSDA) announced today an expansion of its surveillance efforts to detect avian influenza in the state's domestic poultry, particularly backyard flocks that may be exposed to migratory waterfowl.

WSDA is looking for farmers and backyard poultry owners with established flocks who will allow WSDA to take swab samples from live birds or provide eggs for testing. Participants will be reimbursed up to $60 per quarter for providing swab samples or $10 a quarter for providing a dozen eggs to test for the avian influenza virus. WSDA staff will do the quick and painless swabbing and egg pickup during visits to the premises.

"Avian influenza hasn't been found in domestic poultry in Washington, but it will be an advantage to increase the range of our surveillance efforts," said State Veterinarian Leonard Eldridge. "These sentinel flocks will help alert us should avian influenza ever become a problem here. Good surveillance and early detection will allow us to coordinate a rapid response to bird diseases."

The department is particularly interested in testing chickens, pheasants, ducks and geese located near a wildlife or waterfowl refuge, close to commercial poultry operations or within a major migratory waterfowl flyway.

Persons interested in participating in the backyard flock surveillance may contact WSDA through its toll-free Avian Health Hotline at 1-800-606-3056. The hotline also can be used to report sick or dead birds or ask for more information on avian influenza.

As part of a national surveillance program, state and federal agencies continue to test domestic and wild birds for avian influenza, including strains that may transmit to domestic poultry. No case of highly pathogenic avian influenza, which is deadly to birds, has ever been discovered in Washington.

Last year, WSDA sent more than 4,000 bird swabs or eggs to the Washington State University (WSU) Avian Health Laboratory in Puyallup. None of the tests showed signs of avian influenza. Commercial poultry operations conduct their own surveillance and testing as part of their normal biosecurity and disease prevention programs.

WSDA is using U.S. Department of Agriculture funds through a cooperative agreement to support voluntary testing and outreach efforts. Other WSDA activities include making avian influenza sampling kits available to WSU Extension and select veterinary offices, and printing a calendar with avian health information.

The public may also report diseased or dead wild birds, particularly waterfowl or shorebirds, to the Washington State Department of Fish and Wildlife at 1-800-606-8768.

Notifiable Conditions Reminder

Certain conditions are mandated as notifiable in Washington State to protect the public's health. Health care providers, health care facilities, laboratories, and veterinarians are responsible for reporting these conditions to local or state public health agencies. Many of the notifiable conditions are of zoonotic origin, including the emerging pathogens West Nile virus, hantavirus, and cryptosporidiosis. Potential agents of bioterrorism such as anthrax or plague are immediately reportable zoonotic diseases.

For more information, go to the Communicable Disease Epidemiology Web page at www.doh.wa.gov/ehsphl/Epidemiology/CD/.

State's wild birds being tested for avian influenza

By Brandy Ellis, Veterinary Assistant, WA Department of Fish & Wildlife

The western sandpiper is one of the bird species that WDFW conducts live surveillance swab sampling on for avian influenza testing. Western sandpipers breed in Alaska and eastern Siberia in the summer and migrate south during the winter. In spring, seeing several hundred thousand individuals massing in Grays Harbor, Washington is not uncommon.

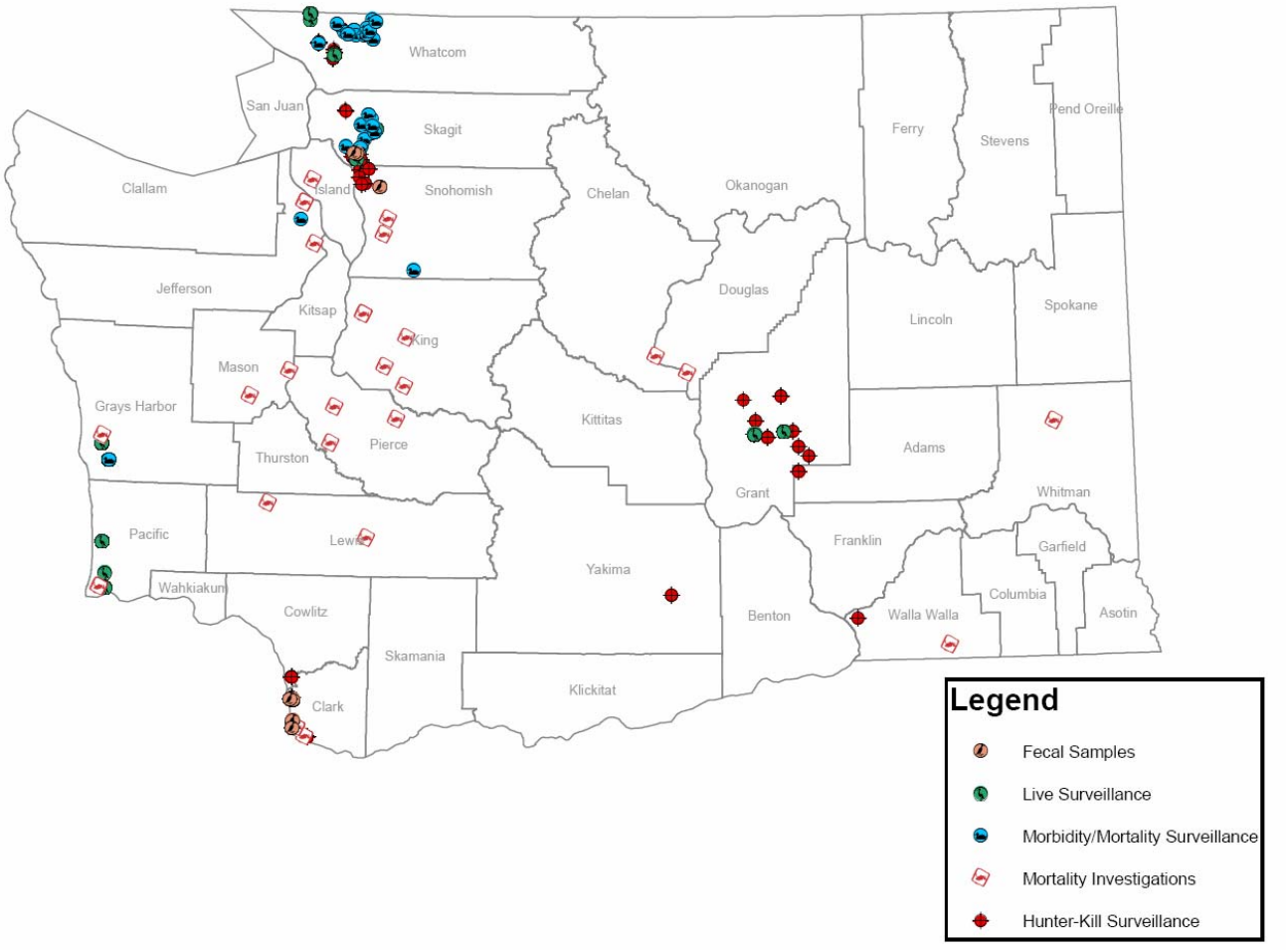
The Washington Department of Fish and Wildlife (WDFW), in cooperation with the US Fish and Wildlife Service and the US Department of Agriculture, are conducting live, hunter harvest, and mortality avian influenza (AI) surveillance throughout Washington.

From July 14, 2006 - January 24, 2007, WDFW has submitted 788 live surveillance swabs, 529 hunter-harvested swabs, 150 fecal samples, and 51 morbidity/mortality swabs for AI testing. Swabs were collected from 20 avian species throughout the state of Washington. In addition, 43 avian carcasses have been submitted for post-mortem examinations.

As of January 24, 2007, lab results for 806 swab samples have been received. To date, 7 samples from mallard ducks have tested positive for an H5 strain of AI virus. There have not been any virus isolations of the N1 subtype of AI virus in Washington, which if discovered, would be of great concern to public and avian health. The National Wildlife Health Center has reported that an additional 23 Mallards, 1 Dunlin, and 1 Western Sandpiper have tested positive for AI viruses that were not of the H5, H7, or N1 subtypes.

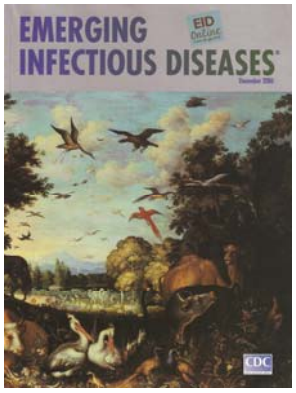
View WDFW's avian influenza Web site at wdfw.wa.gov/wlm/avian_flu/index.htm.

WDFW Avian Influenza Monitoring Locations
As of January 24, 2007



Journal articles from *Emerging Infectious Diseases*

Centers for Disease Control and Prevention. Volume 12, Number 12 – December 2006



The December 2006 issue of *Emerging Infectious Diseases* focuses on zoonotic diseases.

Review of Bats and SARS.
Wang LF, et al. www.cdc.gov/ncidod/eid/vol12no12/06-0401.htm

Abstract: Bats have been identified as a natural reservoir for an increasing number of emerging zoonotic viruses, including henipaviruses and variants of rabies viruses. Recently, we and another group independently identified several horseshoe bat species (genus *Rhinolophus*) as the reservoir host for a large number of viruses that have a close genetic relationship with the coronavirus associated with severe acute respiratory syndrome (SARS). Our current research focused on the identification of the reservoir species for the progenitor virus of the SARS coronaviruses responsible for outbreaks during 2002–2003 and 2003–2004. In addition to SARS-like coronaviruses, many other novel bat coronaviruses, which belong to groups 1 and 2 of the 3 existing coronavirus groups, have been detected by PCR. The discovery of bat SARS-like coronaviruses and the great genetic diversity of coronaviruses in bats have shed new light on the origin and transmission of SARS coronaviruses.

Risk Factors for Human Infection with Avian Influenza A H5N1, Vietnam, 2004.
Dinh PN, et al. www.cdc.gov/ncidod/eid/vol12no12/06-0829.htm

Abstract: To evaluate risk factors for human infection with influenza A subtype H5N1, we performed a matched case-control study in Vietnam. We enrolled 28 case-patients who had laboratory-confirmed H5N1 infection during 2004 and 106 age-, sex-, and location-matched control-respondents. Data were analyzed by matched-pair analysis and multivariate conditional logistic regression. Factors that were independently associated with H5N1 infection were preparing sick or dead poultry for consumption ≤7 days before illness onset, having sick or dead poultry in the household ≤7 days before illness onset, and lack of an indoor water source. Factors not significantly associated with infection were raising healthy poultry, preparing healthy poultry for consumption, and exposure to persons with an acute respiratory illness.

Raising and preparing healthy poultry for consumption were factors not associated with avian influenza illness.

❖ Upcoming ❖

Conferences Meetings Workshops

WA State Zoonotic Disease and Vector-borne Disease Workshops
March 13 (Mt. Vernon) March 15 (Lacey)
March 20 (Spokane) March 22 (Richland)
www.doh.wa.gov/ehp/ts/Zoo/Workshop07.htm

Epi Road Show
Target audience: communicable disease investigators/epidemiologists
March 29 (Moses Lake) April 5 (Kenmore)
www3.doh.wa.gov/waphtn/class.asp

American Mosquito Control Association 73rd Annual Meeting
April 1-5 (Orlando, Florida)
www.mosquito.org/meetings/index.aspx

CDC's 2007 National Conference on West Nile Virus in the United States
Canceled due to expected reduction of WNV funds in fiscal year 2007

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ZD Program Web site
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Higher temperatures can lead to faster mosquito developmental cycles, resulting in larger adult populations and a longer season for disease transmission. Warmer temperatures can also contribute to increased viral replication, reducing the extrinsic incubation period (the time required for a mosquito to become infective after being exposed to a pathogen) and accelerating the spread of disease.

In addition to temperature, changes in humidity and rainfall would influence vector populations and ranges. Increased precipitation could provide additional habitat for mosquitoes and other arthropods that require a more humid climate. Decreased precipitation could allow vectors that can tolerate drier climates to either expand their ranges or become more prevalent than what they would be in a wetter climate. Increased precipitation and warmer water in many parts of the world will almost certainly favor the spread of the several snail species that act as intermediate hosts of human schistosomes. Tick species would also be likely to expand their ranges.

Aedes aegypti is the primary vector for viruses that cause human dengue and yellow fever. This species is found in most tropical and subtropical regions and will expand its range if global warming trends continue.

On the brighter side, such changes could also impact vector populations in a negative way. While dry heat kills mosquitoes quickly, too much rain could have the same effect simply by washing away mosquito larvae.

The potential increase of forest fires in the Pacific Northwest is a major concern. Trees that survive a fire are often stressed, which can attract wood-boring insects such as bark beetles and the mountain pine beetle. These insects further stress or kill trees and can decimate wide swaths of forest. The open spaces that replace forests provide food and habitat suitable for deer and rodents, both of which serve as hosts for ticks and, in the case of certain rodents, serve as reservoirs of hantavirus. The edge habitat created at the interface of open and forested areas is a preferred area for ticks to lie in wait for potential hosts.

Although we are faced with the increased probability of diseases expanding into areas where they once were unable to thrive, by taking critical steps now, we can improve our response capabilities and decrease the risk of future epidemics. Public health control of vector populations requires surveillance and response capability. A sound surveillance program requires a thorough understanding of the biology, ecology and interactions of the vector and its vertebrate hosts. The transmission of pathogens, particularly in the case of arboviruses like West Nile virus, is dependent on these interactions.

Get tips on what you can do about climate change from the Department of Ecology at www.ecy.wa.gov/climatechange/.

Surveillance systems quantify disease activity at a given time, predict the probable future course of the disease cycle, and indicate when control should be started to prevent epizootic or epidemic transmission. Successful surveillance includes data on mosquito or other vector population indices, pathogen infection rates in the vector population, evidence of increased pathogen transmission in vertebrate amplifying hosts, evidence of disease in mammalian hosts, rainfall and temperature data, time of year and risk to the human population. These multiple variables are used to provide an early warning of epidemic activity. Control measures should be started when a particular predictor or a combination of predictors exceeds an action threshold based on surveillance data and public health outcomes.

Actions should be taken to limit the causes of global warming but we must continue to improve our response capabilities and control strategies should climate change present a new vector or vector-borne pathogen to our region.